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From "The Practitioner" *for December*, 1909.

THE RELIEF OF HEADACHES BY THE CORRECTION OF ERRORS OF REFRACTION.

By DUNCAN MATHESON MACKAY, M.D.,

Honorary Assistant Ophthalmic Surgeon, Hull Royal Infirmary; Late Clinical Assistant, Royal London Ophthalmic Hospital; and Refraction Assistant. Royal Eye Hospital, Southwark.

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By DUNCAN MATHESON MACKAY, M.D.,
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[With Plates XIII.—XVIII.]

"to . . . . end
"The" head-"ache . . . .
"That flesh is heir to, 'tis a consummation
"Devoutly . . . . wish'd"[1]

by thousands of our patients, and aimed at even by those medical men, who most firmly hold that it is the treatment of disease which is their function—not the relief of symptoms.

But that the consummation too often is not attained is obvious; and we do not wonder, therefore, when we see our patients hurry from one doctor to another, and, finally, having tried us all in vain, betake themselves to their own treatment by means of advertised remedies. "Treatment," they call it, but, in reality, they do not expect to be cured; they are content if their attacks of headache can be relieved temporarily by the taking of "headache powders"; and they often succeed in attaining that, though occasionally their powders are so active that their heads are for ever put out of the reach of aches altogether.

Headaches are, admittedly, even by ourselves, often beyond our power of removal. But many of the headaches which years ago patients would have been told to put up with can, now that the science and art of medicine and surgery have more advanced, be got rid of, and that without the aid of drugs, which too frequently simply give the sufferer ease by narcotising him.

Of late years it has come to be recognised that a large number of the headaches for which no disease seems to be answerable—*functional* headaches, that is, as distinguished from *organic*—have been relieved by the discovery and treatment of strain on the part of the eyes.

Of all the causes of eyestrain the most frequent is the presence of an error of refraction, and it is to the headaches which are relieved by the correction of such errors that I propose to confine my remarks.

Every practitioner has had experience of such cases; but yet I venture to record here, briefly, some which will illustrate the benefit to be obtained by such correction.

A housemaid, of Scandinavian nationality, aged 29, complained of what she called "migraine." Her attacks of headache were frequent, beginning after dinner, and often continuing all night; and, on account of them, she had given up reading and sewing. The physician, whom she had consulted some months earlier, suspected that her eyes might be the cause of the discomfort, but for months she took medicine without any benefit. I found in each eye a small error of hypermetropic astigmatism, and no other affection of the eyes except a slight "want of balance." The astigmatism was so small in amount that I might well have hesitated to advise the wearing of the correcting glasses; but still I did advise it. Five days after the spectacles were first put on, the physician informed me that the patient said she was quite well. Two months later I saw her myself, and she reported that she had been entirely free from headaches since she began to wear the glasses, and that she sewed, read, and crocheted without discomfort.

Another case was that of a High School girl, aged 18, who, as an examination approached, for which she had been studying a year, found that she had to diminish her hours of reading, because of aching at the top of her head, which came on especially in the evening. Her visual acuity was above the standard, but there was in each eye a very small error of hypermetropic astigmatism. I advised her to wear glasses for reading, which corrected that error. In less than a fortnight she reported that she had had no headache since taking to the glasses, and that she could work again as long as before.

A trained nurse, aged 31, for six months had suffered from frontal headaches, which might be present at any time, but which sewing and reading made worse. The error she showed was a comparatively small one of shortsightedness. She acted upon my advice to wear the correcting lenses constantly, and, three months later, she said she had had no headache since she got the glasses, and could read with comfort.

Another case was that of a boy of 13 at school. His father said that the boy had suffered, for two or three months, from headaches, which were sometimes so severe as to make him cry. They were most felt towards the end of the day, though the boy was not a great reader, and was no more free from discomfort on Saturdays and Sundays than on other days. His eyes showed a small error of farsightedness, and I recommended that he should wear glasses to correct it. This he did, and six days later he said that he had been quite free from headache.

Again, a man of 25, engaged in superintending his own engineering shop, had what he called "bilious attacks," though his description of them suggested typical migraine :—about once a month, without any warning, he suddenly saw specks before his eyes, and objects about him began to move; then headache set in, followed by vomiting. Then the specks disappeared, but he remained prostrate for about 24 hours. Examination revealed an error of hypermetropic astigmatism in each eye, and I advised him to wear the correcting lenses constantly as an experiment, for I am never particularly hopeful of relieving migraine in this way. He did not take kindly to the glasses, but I believe he wore them pretty regularly, and 14 months later he reported that he had not had a single attack since he took to them.

One more case, this time a tradesman of 40, who occasionally suffered from severe "sick headache." His vision was up to the standard, but he had a small error of hypermetropic astigmatism, and accepted the weakest ordinary astigmatic lens in each eye. The wearing of these lenses, though not constantly, sufficed to dispel the headache, from which he had suffered at intervals all his life.

I have recorded these cases, though they are such as every one who is interested in eyes is seeing frequently, because they show that headaches, occurring in any class or vocation of life, in either sex, and at any age, may be relieved by the one measure—the wearing of spectacles which correct errors of refraction which are present.

Some critics, in view of the fact that relief follows the correction of errors—so small in some cases as not to impair the power of vision—may be inclined to hold that the relief is due to "suggestion" in neurasthenic subjects. Sometimes I have been tempted to say the same myself; but against that view this is to be reckoned, that the patients whom I have enumerated—and many others--did not show any other stigmata of hysteria, which I could discern; neither, presumably, were any such stigmata observed by the physicians and surgeons who referred the patients to me, and who had themselves treated the headaches for, in some cases, months, using, I am satisfied, the most approved remedies that medicine has provided for the relief of such conditions.

I am myself convinced that it is a clinical fact that headaches may be relieved by the correction of errors of refraction—even minute errors. In this I take my stand with the modern ophthalmic surgeons, whose position is represented, in perhaps a too extreme manner, by the American school, with Dr. George M. Gould as its mouthpiece, as against the older ophthalmic surgeons, who teach that astigmatism of small amount may be ignored.[21]

This view, that astigmatism of less than 1 D is of no importance, was enunciated by the *Lancet*, as recently as in 1904,[8] on the authority of certain "London ophthalmologists," and of Donders, the discoverer "of the existence and the frequency of hypermetropia, . . and of the frequency of astigmatism," whose opinion is recorded in his monumental work on *Accommodation and Refraction of the Eye.*[9]

This counterblast by the *Lancet* to the teaching of Dr. Gould in his *Biographic Clinics*,[23] led to a good deal of correspondence in the medical journals about that time, and to the publication of several papers containing actual experiences; and though few British oculists, if any, go the whole way with Dr. Gould in thinking that most general ailments are to be attributed to errors of refraction, many have recorded that the correction of even minute errors of refraction has, in their own practice, relieved patients—not hysterical—of headaches.

Now, if the headaches are relieved, or even diminished, while the glasses are being worn, it is fair to reason that the glasses have led to the disappearance of something which was the cause of the headaches.

That something is usually spoken of as "strain." But why eyestrain should produce headaches is not perfectly clear, and it is probable that there are more paths than one by which the effect is reached.

For the exact explanation we have to look to physiology, but I think I may venture to put some of the data before you as succinctly as I can, and then offer an explanation.

OPHTHALMIC OPTICS.

To begin with, I will run over briefly the necessary rudiments of ophthalmic optics.

First of all, one must remember that rays of light proceed from any and every point in all directions (Fig. 1). Some of

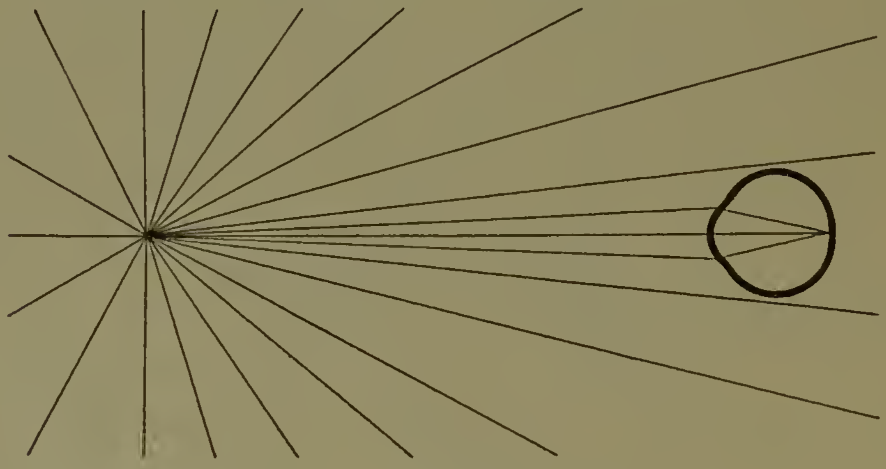


Fig. 1.

the rays enter an eye which is turned towards the point from which they are proceeding. The nearer the point is to the eye, the more divergent the rays are when they reach the eye (Fig. 2); the farther away, the less divergent, so that if they come from at least six metres away the divergence is so slight that the rays can be considered to be parallel (Fig. 2).

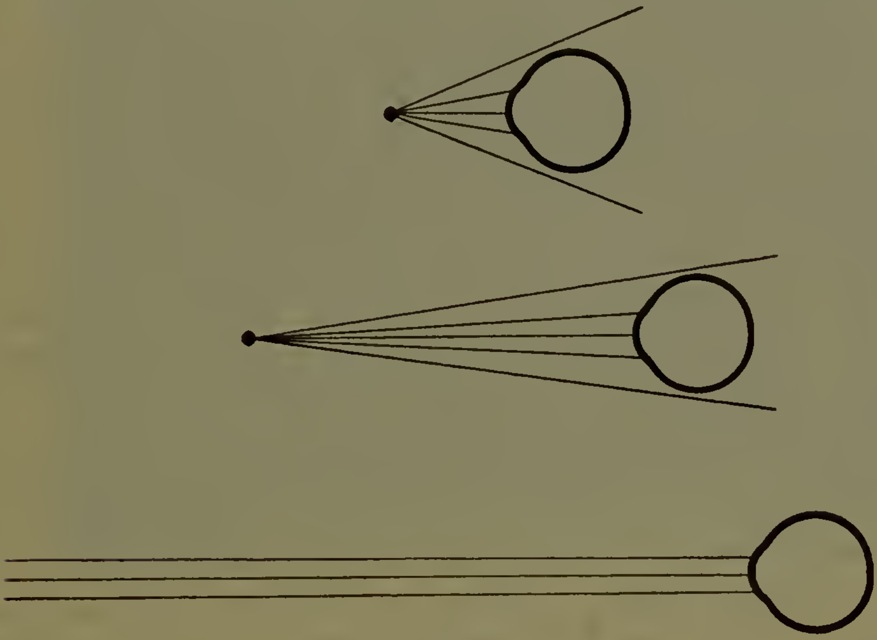


Fig. 2.

EMMETROPIA.—The rays that enter the eye, by passing through the refracting media—cornea, aqueous humour, lens, and vitreous humour—are made convergent (Fig. 3). In order to have clear vision it is necessary that these rays be made just so convergent that they meet on the retina. The point at which they meet is called their "focus." In an emme-

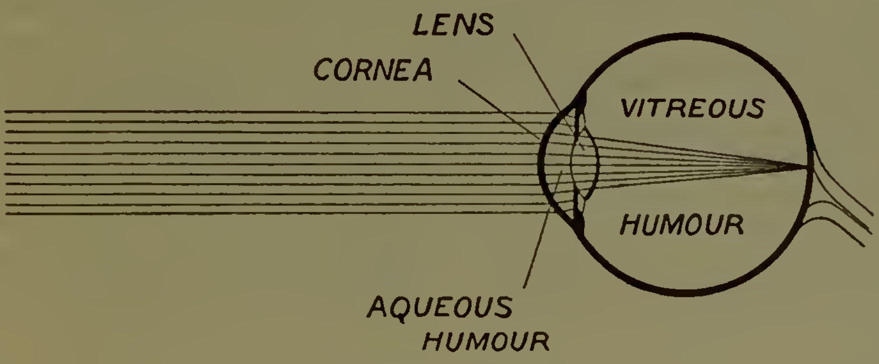


Fig. 3.

tropic eye, that is, a normal eye, the refracting power of the transparent media is such that parallel rays focus on the retina; or, to put it in another way, the retina of an emmetropic eye is just so far behind the cornea that the focus of parallel rays falls on it.

AMETROPIA.—(*a*) *Hypermetropia and Myopia.*—If, however, the retina is not this distance behind the cornea, the eye is said to be "ametropic." If the retina is in front of the point at which focussing occurs, that is, if the eye be shorter than an emmetropic eye, it is called a "hypermetropic" eye. If the retina is beyond the point at which focussing occurs, that is, if the eye be longer than an emmetropic eye, it is called a "brachymetropic" or "myopic" eye. In either case, instead of a clear image being produced of each point, there is produced a diffused image. And, of course, as every object and its image are made up of points, it follows that the image of an object must be diffused just as the image of each point is.

(*b*) *Astigmatism.* — There is, however, another form of ametropia in which the essential fault is not one of length ot the eyeball, but of the curvature of the cornea.

A perfectly emmetropic eye and a simply hypermetropic or myopic eye have all the meridians of the cornea curved exactly the same, so that the cornea is, in fact, a segment of a sphere. If the meridians of the cornea are not of the same curvature, but, for example, if the meridian from above downwards is more sharply curved than that from side to side—if, that is, the curve of the cornea from above downwards is the segment of a smaller circle than that from side to side, the eye is called "astigmatic." I am in the habit of roughly and popularly comparing the cornea of an emmetropic eye, or of a hypermetropic or myopic eye, to a segment of a ball, while, in the case of an astigmatic eye, I compare its curves to those of a man's felt hat, in which the curve from side to side is shorter than that from before backwards.

If an eyeball has the proper length of an emmetropic eye, but has the curvature of the cornea from side to side less sharp than that from above downwards, the less acute curvature has the effect of diminishing the refractive power of the cornea in that meridian, and consequently the rays

Plate XIII.

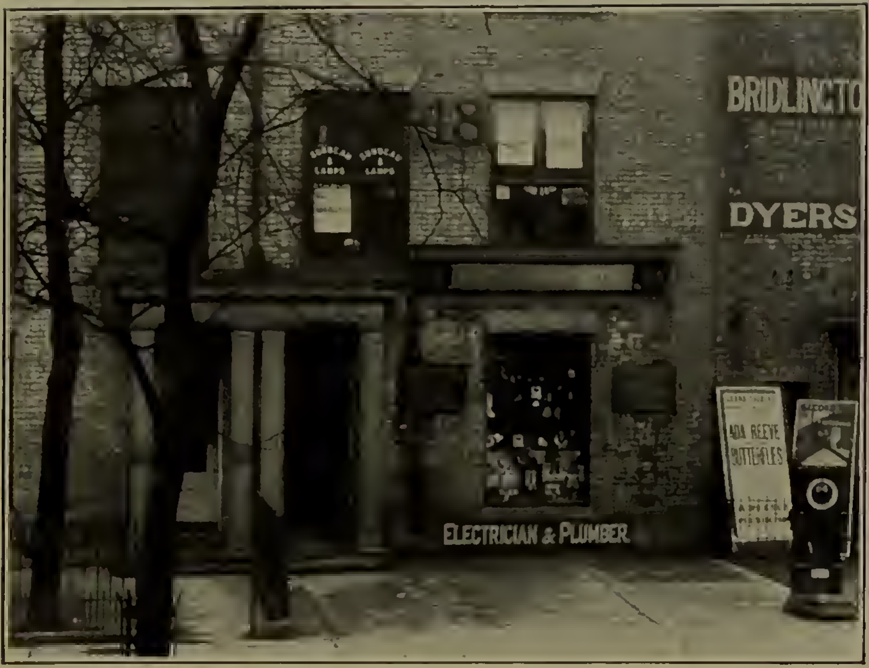
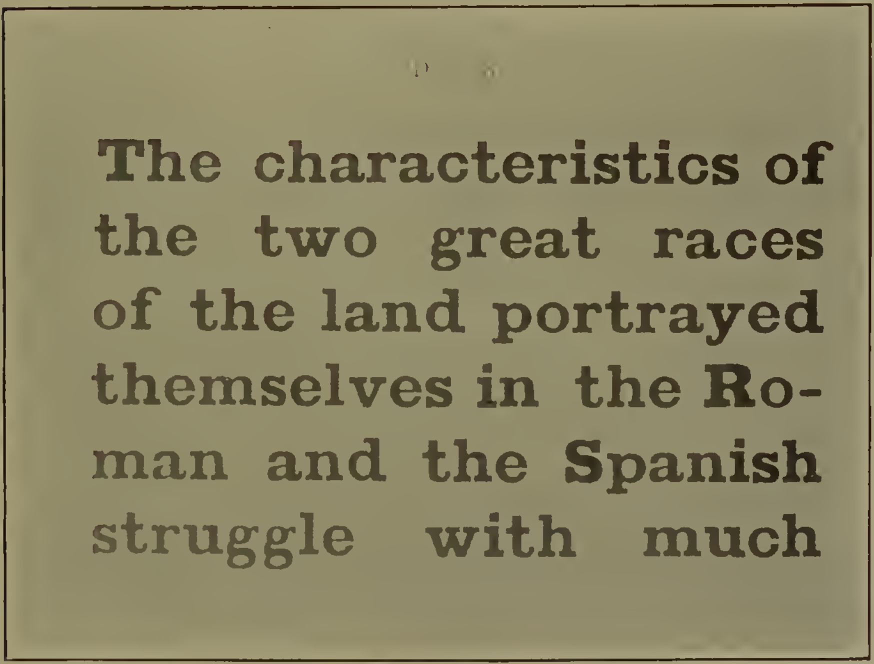


Fig. 5.



The characteristics of the two great races of the land portrayed themselves in the Roman and the Spanish struggle with much

Fig. 5*a*.

Emmetropia.

PLATE XIV.

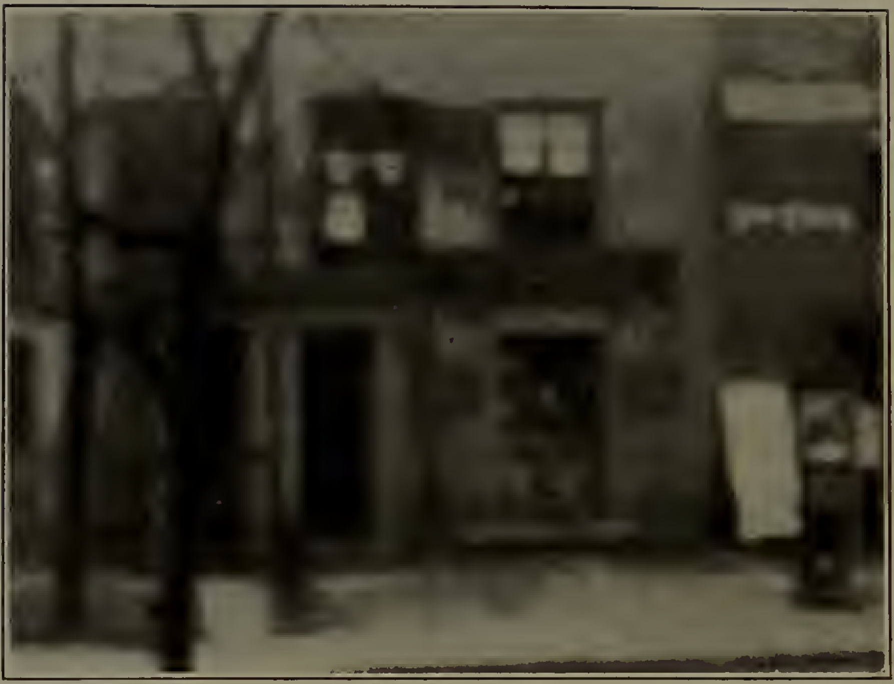


Fig. 6.

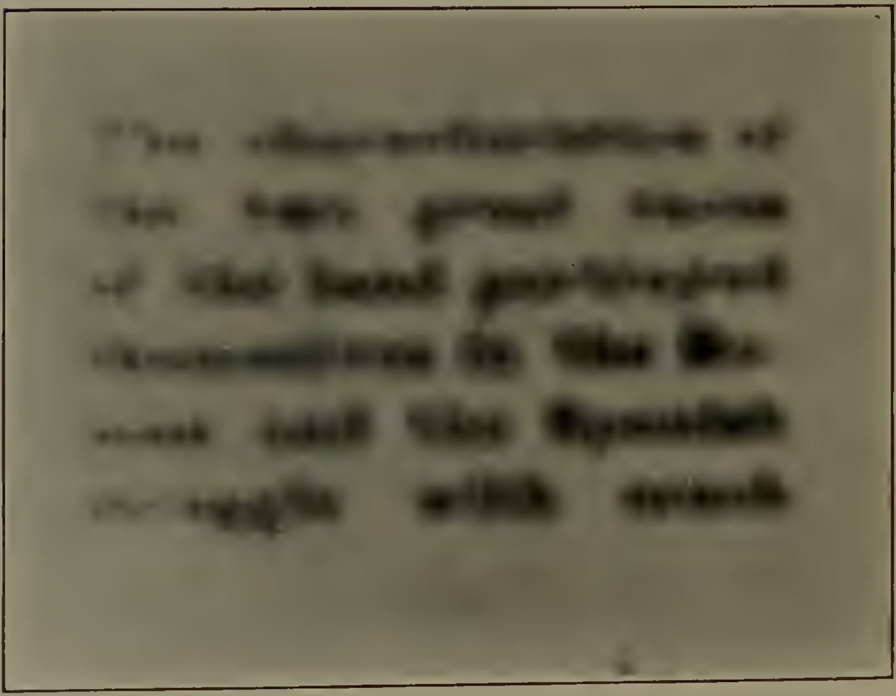


Fig. 6*a*.

Hypermetropia (2 *D*).

Plate XV.

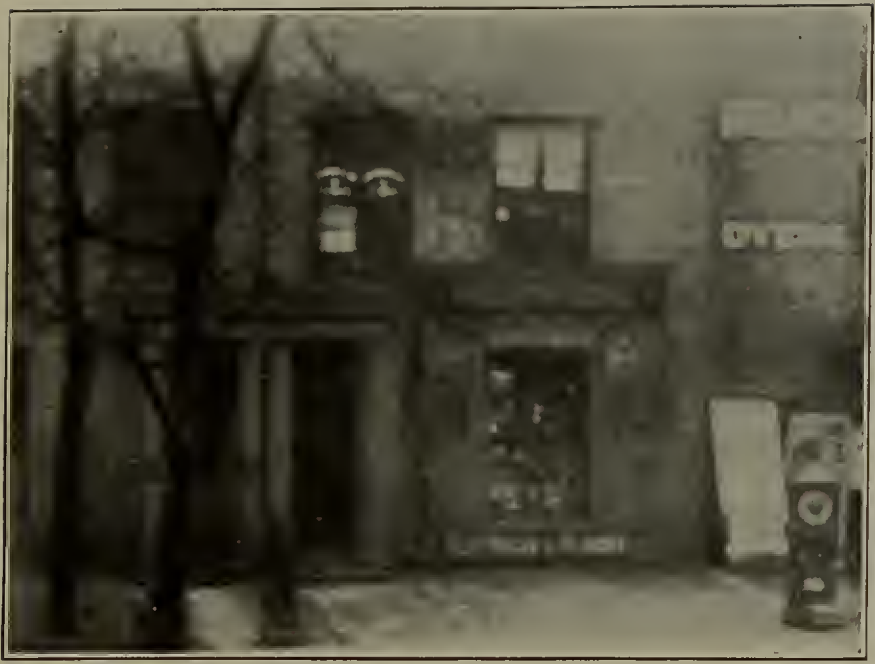
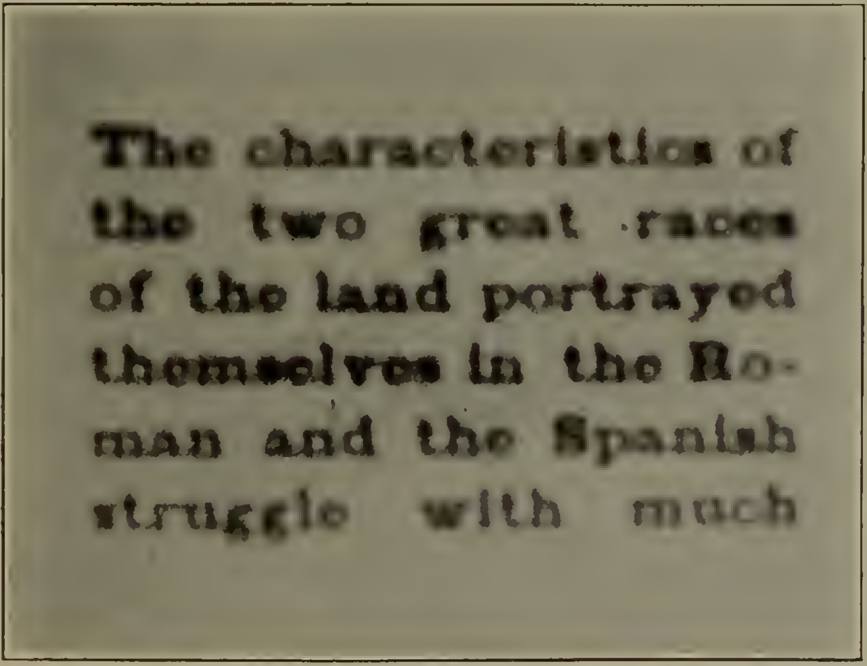


Fig. 7.



The characteristics of the two great races of the land portrayed themselves in the Roman and the Spanish struggle with much

Fig. 7*a*.

Hypermetropia (1 *D*).

the suspensory ligament to relax. This relaxation permits the lens, by its own elasticity, to become more spherical. And this increase in the sphericity of the lens increases its refractive power, and, if the increase is sufficient, the rays will be focussed on the retina, and a clear image be produced. In that case, as in the case of the emmetropic eye, the eye is satisfied. But observe what happens in order that this clear image may be obtained and preserved. The ciliary muscle must contract, and keep contracted. As soon as the muscle relaxes, the image becomes indistinct.

Again, if it is a myopic eye which is looking at the distant object, the rays focus in front of the retina, and, consequently, a blurred image is produced, just as in the case of a hypermetropic eye.

In order to get a clear image in a myopic eye, what is needed is a weakening of the refractive power of the eye, so that the focus may be displaced backwards. But there is no means in the eye by which this can be brought about. Contraction of the ciliary muscle only increases the difficulty. So the blurred image remains, and the myope soon learns that he must put up with indistinct vision.

If, again, the eye is an astigmatic one, there is here, also, produced a blurred image. Like the hypermetropic eye, the astigmatic eye instinctively, by contracting the ciliary muscle, strives after a clear image. Now, if the ciliary muscle were capable of irregular contraction, so that part could contract, while part remained relaxed, and the lens be influenced accordingly, then in many cases of astigmatism, as in many cases of hypermetropia, the error could be exactly overcome, and the image made clear, in which case we should have the same condition as in small errors of hypermetropia. I am doubtful, however, if the muscle can contract irregularly; but this is a point upon which difference of opinion exists, and upon which the physiologists must adjudicate. If it cannot contract irregularly, as I believe, then it follows that the image can never be made clear by muscular effort; for the difference between the foci of different meridians will remain the same, though the foci themselves may be altered in position. If the ciliary muscle, by its action, brings the focus, which is not on the retina to the retina, it will, by the same amount, remove the focus that was on the retina an exactly equal distance behind it; and so, the muscular action having been called forth, the result is still a blurred image. If, for example, the error be + 1 D, and the ciliary muscle contracts so that the focus is altered 1 D, the image is still indistinct (Figures 9, 9*a*, 10, and 10*a*). The eye has made a muscular effort and it has obtained nothing by it. But yet it recognises, perhaps unconsciously, that muscular action has taken place—muscular action, which it had hoped would give clear vision, as it might have done in hypermetropia,—and only when the effort has been completed does it realise its futility, and so suffers disappointment. Here, then, is another factor to be reckoned with, this time a mental factor—that of psychical disappointment and irritation at failure.[20]

Probably this unavailing muscular movement continues to be made, at all events in small errors of astigmatism, whenever objects are looked at, and is followed, invariably, by disappointment.

2. NEAR VISION.—*a. Accommodation.*—In near vision we have to recognise that as the object looked at is within six metres of the eye, the rays emanating from it are divergent when they reach the cornea (Fig. 2). To render divergent rays convergent, so that they may focus on the retina, it is necessary to increase the strength of the refracting media. This is done, as in the case of hypermetropia, as already described, by contraction of the ciliary muscle, and this contraction with the effect it produces upon the crystalline lens, is what is known as "accommodation."

In emmetropia accommodation takes place, but the amount being physiological, it causes, in the absence of other disorders, no discomfort.

In hypermetropia also accommodation takes place. But as in distant vision accommodation is already taking place, this distant-vision accommodation is extra to that which is needed for near vision. So that a hypermetrope exerts his ciliary muscle more than an emmetrope does.

In myopia the condition varies according as the far-point of the eye is beyond, or at, or within, the position at which the near object is placed. In any case, however, the amount of accommodative effort is less than in either emmetropia or hypermetropia, because accommodation has to be exerted only within the far-point. If, for example, the far-point corresponds with the position in which the object is held, there will be needed no accommodation at all. In myopia, therefore, whether accommodation is needed or not, it is, at all events, less than in emmetropia.

In astigmatism there is precisely the same condition, so far as near vision is concerned, as in eyes which are not astigmatic. Accommodative effort occurs, but the presence of the astigmatism prevents the image on the retina from being clear, just as it does in distant vision; and the same psychical irritation follows the repeated failure to obtain clear images.

b. Convergence.—In near vision, however, there is another muscular action besides accommodation which has to be remembered. This is "convergence" of the visual axes. When one looks at a distant object, the eyes are directed parallel to one another (Fig. 4). As the object approaches nearer, it is easy to see that the eyes turn towards one another, in order to keep, both of them, fixed on the object. We have already seen that it is this nearness that calls forth accommodation; so, obviously, accommodation and convergence are associated movements. The stimulus to accommodate is also the stimulus to converge. Yet the association is not rigid, for it is possible to converge without accommodating, and, conversely, it is possible to accommodate without converging. But the rule holds that accommodation goes along with convergence.

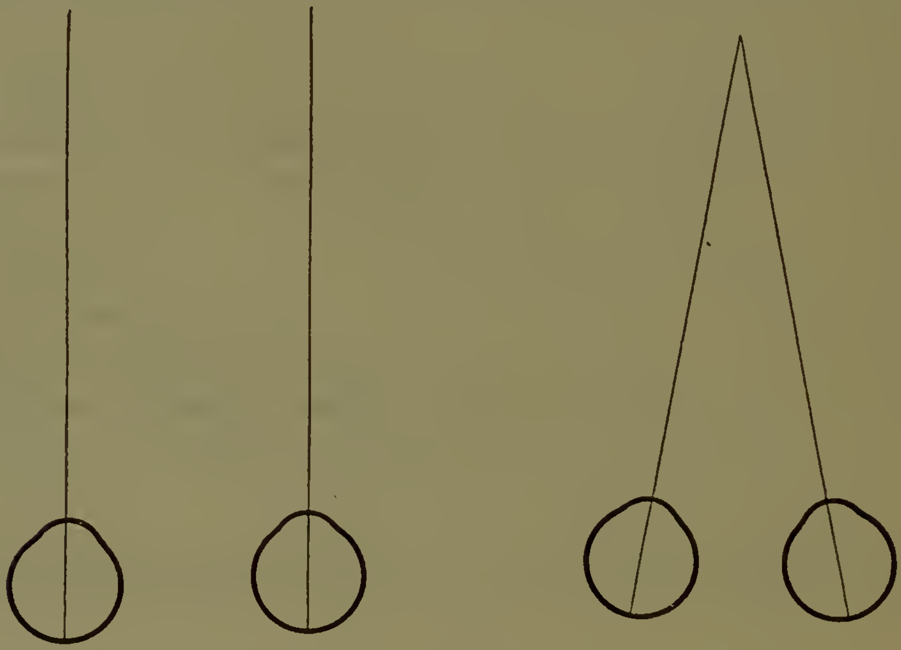


Fig. 4.

When an emmetrope looks at a near object, and accommodates, say, 2 D, he exerts also 2 metres of convergence. When a hypermetrope of 1 D, for example, looks at a near object, he requires to accommodate 3 D, for he was already accommodating 1 D, before he turned to the near object, which requires 2 D. He receives, therefore, a stimulus to converge through 3 metres. But that is 1 metre more than the distance of the object requires. He can, however, dissociate the two movements within certain limits, and, by making only that movement of each kind which is necessary, he sees the near object as though he were an emmetrope. But observe, he has had to dissociate two associated movements, as well as use more accommodative power. If a myope looks at the same near object, he accommodates, as we have seen, less than the emmetrope. If, for example, he has to accommodate only 1 D, instead of 2 D, the stimulus to convergence is only for 1 metre. But that does not suffice to fix both visual axes on the object; to do that he must converge through 2 metres. Therefore, a myope also has to dissociate the two associated movements, and has to exert convergence in excess of accommodation. So that a myope, though he may not need to accommodate at all, is not relieved from the necessity of muscular action—he must converge, dissociating two ordinarily associated movements. If an astigmatic person looks at the same near object, his astigmatism in itself has no effect upon convergence.

SUMMARY OF OPTICS AND PHYSIOLOGY.

This long and, I am afraid, tedious account may be summed up into this: that in hypermetropia, both in distant and near vision, clear vision, if it is obtained at all, is obtained by the employment of continuous and excessive action of the ciliary muscle, and by the action of convergence dissociated from accommodation; in myopia, clear near vision is obtained only with convergence in excess of accommodation; in astigmatism, clear vision is not obtained at all, though it is aimed at by repeated or continuous action of the ciliary muscle, and this inability to get clear vision leads to psychical irritation.

EXPLANATION OF HEADACHES.

How, then, do these conditions cause headaches? The ciliary muscle is an involuntary muscle, and it is characteristic of involuntary muscle that its activity alternates with rest—it has rhythmicality.[10] The ciliary muscle is, normally, slightly contracted, and though it cannot be thrown into tetanus,[12] it yet can enter into a state of sustained contraction.[12] Sustained contraction of any muscle, unstriped as well as striped, is followed by fatigue,[13] which "is due to the consumption of the substances available for the supply of energy in the muscle, but more particularly to the accumulation of waste products of contraction"[13]; and Mosso has shown, by means of his ergograph, "that the fatigue products produced in the muscles during work cause most of their injurious effects by acting on the central nervous system and diminishing its power of sending out impulses."[14]

The ciliary muscle is supplied by the ciliary nerves, and these, again, come from the ciliary ganglion, which is connected, by some of its roots, with the sympathetic nervous system. It is reasonable to suppose that excessive activity of the ciliary muscle, among the fibres of which the sympathetic nerve-endings are, will be followed by irritation of the sympathetic system. And irritation of the sympathetic may give rise, as Osler[15] indicates, to spasm of the cerebral arteries, which "through increase of vascular tension" gives rise "to a higher velocity of flow through the cerebral capillaries," and hence results in cerebral hyperæmia or "congestion of the brain," showing itself in headache, insomnia, and other unpleasant sensations.[16]

These, I take it, are the actual explanation of the headaches which are associated with errors of refraction: mainly, first, irritation of the sympathetic in the ciliary muscle producing congestion of the brain, and, in less degree, the disturbance caused by the necessity of dissociating two associated movements, and the irritation resulting from the inability, in spite of repeated efforts, to obtain clear images on the retina.

If this be the explanation, one might think that headache would be present in every person having such an error, and would be always present. Yet some ametropes never suffer from headache.

One class of such ametropes consists of those whose error is very large—so large indeed that, though it may be simple hypermetropia, the fullest contraction of the ciliary muscle is not sufficient to focus rays upon the retina. Hence, whatever the person can do, he always has indistinct vision.

And so he resigns himself to the inevitable, and, recognising that his muscular efforts are fruitless, refuses to make them. He, therefore, has no headache, but he has no clear vision.

Another class of ametropes who do not suffer from headache are those who do not use their eyes for anything that requires exact observation; this is probably the reason that it is amongst the indoor-workers—dressmakers and clerks, students and teachers,—that we find the headaches, rather than amongst the outdoor-workers—farm labourers, carters, and domestic servants who do not have sewing as part of their duties.

In this connection, too, one understands why the American insists upon the correction of errors of refraction even more than the Englishman, and why the Englishman insists more than the Continental.[11] For in the States, life seems to be more strenuous than in England, while the Continental, though his hours of work are long, works much more leisurely.

And then one must remember that other conditions have to be considered—conditions, mainly, of the general health, and of excessive nervous sensibility. The ciliary muscle, like any other muscle, is affected by lowered vitality, which comes with years. And, therefore, whereas a child can keep up a contraction of the ciliary muscle for a long time without discomfort, an older person is rendered uncomfortable by a much shorter period of activity. And as the muscular system is most vigorous at the beginning of the day, one can understand why the first complaints are usually made at the end of the day, for then the ciliary muscle has been used for several hours. Similarly, convalescence from a long illness may be the occasion of a person's first noticing dimness of vision or discomfort after the use of the eyes. This, again, explains why holidays may remove the headache, not only because holidays usually mean a rest from close work, but also because they restore the muscular vigour by means of an open-air life. And in like manner, refraction headaches may be removed by tonic medicines in some cases.

The amount of the error, of course, affects the amount of contraction that needs to be exerted:—1 or 2 D may be overcome comfortably, while the attempt to overcome 4 or 5 D quickly provokes pain. And no one habitually uses the whole of the contractile power of the muscle; 50 per cent.

was the amount, I think, which Donders reckoned the maximum that could be put forth with comfort.

EXPLANATION OF RELIEF OF HEADACHES BY CORRECTION OF ERRORS OF REFRACTION.

What happens, then, when one places, before an ametropic eye, a spectacle lens? If the lens be a convex one, the effect is as though one increased the length of the eye. A short eye—a hypermetropic eye—becomes, as it were, a longer eye. Or, in other words, the refractive media of the eye, by the addition of the lens, are made more powerful, so that rays come to a focus before they have passed so far back as they did before; and, if the spectacle lens is of just the right strength, parallel rays focus on the retina. As a consequence, the eye finds itself in the same condition as an emmetropic eye—rays coming from distant objects are focussed on the retina without any effort of accommodation at all—the ciliary muscle is not employed in looking at distant objects. And so what had caused the headache has been removed, for near vision now only requires the same accommodative effort as if the eye were emmetropic.

Again, if the lens—this time a concave one—be placed in front of a myopic, or long eye, the effect is as though one shortened the eye; in other words, made the refractive power of the eye weaker. Parallel rays, which before focussed in front of the retina, now have their focussing point displaced backwards. And if the concave lens be of just the right strength, then the focus is brought precisely on to the retina, and, again, distant objects are seen clearly. In looking at near objects, then, the myope, wearing his correcting lens, requires to exert the same amount of accommodation as an emmetrope, and, in those who begin the use of glasses early enough, the amount of accommodation called forth is the same as the convergence, and the two movements are associated, as they were intended to be.

If the eye be astigmatic, and one puts before it the cylindrical lens that corrects it, the influence of the added lens is exerted only in the meridian which is at fault, and the rays passing through that meridian are brought to a focus at the same place as the rays passing through the emmetropic meridian. Consequently vision is made clear, and the eye ceases to exert any muscular action, except when it is turned to a near object, and then it behaves as an emmetropic eye. Not only, therefore, has the astigmatic eye been set free from the need of the action of the ciliary muscle, but it has also been relieved from the psychical irritation consequent upon inability to see clearly even with that action.

CHARACTERISTICS OF HEADACHES.

In order that my paper may have practical value it is desirable that I say something in closing as to how one may distinguish the headaches which are likely to be relieved by the correction of errors of refraction, from those that will not be influenced. Unfortunately, there is nothing characteristic about these headaches, either as to their position or their severity, or the time at which they occur. "The headache may vary from a moderate frontal distress to violent explosions of pain, and may be situated in any portion of the cranium."[17] Some points, however, may be noticed. There may, for example, be "great discomfort when attempting to watch moving objects."[18] In this connection, one has to remember what are called in America "theatre headaches," which come on after attending a play, or going through a picture-gallery, or watching a cinematograph exhibition; and also the headaches which so many people suffer from at the end of a long railway journey, during which they have spent the time which they did not give to reading in looking out of the window. "The pain may immediately follow the use of the eyes, or be delayed, or come on at a certain hour of the day, or even night."[18] And the headaches which depend upon ocular errors are frequently not associated with the use of the eyes at all by the sufferers. Toms,[19] who examined records of over twelve hundred patients, found "that one half . . . revealed ocular defects which were never surmised by the patients themselves, and many of them were exceedingly sceptical of the suspected cause, inasmuch as they could not directly attribute, subjectively, the cause to their eyes, their vision being apparently good for all distances and conditions of light or work."

Many of the headaches are what are called "bilious" headaches; and hemicranias and migraine occasionally are dependent on refractive errors.

Even though the headache does not develop until middle life or even later, the eyes may still be the cause, in view of what I have shown as to the further influence of bodily vigour upon the ciliary muscle.

CONCLUSION.

In conclusion, therefore, I may sum up the attitude of ophthalmologists towards the relief of headaches as being that every case of headache which is not removed by other means should be suspected of refractive error, and that this suspicion should only be dismissed if refractive error is proved to be absent. Doubtless, in many cases, the spectacles fail to relieve the headache; but this only indicates that other conditions may co-exist with the error of refraction, and be of more importance in the causation of the trouble. A sufficient number of successful cases have been observed to encourage one in the expectation of relieving the headaches in this way. Of course, unsuccessful cases exist; of those I do not speak, for unsuccessful cases do not, as a rule, return to us—they try someone else; but if that someone else again examines the refraction, as he often does, and prescribes spectacles, and so relieves the headache, then the case becomes a successful one.

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